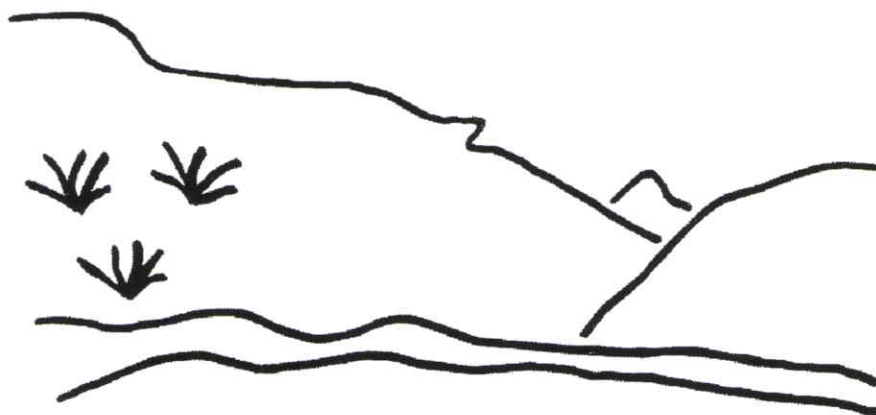


# State of Utah



## Utah Oil Gas and Mining

### Coal Regulatory Program

Crandall Canyon Mine  
Genwal Resources, Inc.  
Technical Analysis  
February 3, 2006

Mine # C/D15/0032  
File OUTGOING  
Record # 0003  
Doc. Date 2/3/06  
Recd. Date 2/3/06

## TABLE OF CONTENTS

---

<b>TECHNICAL ANALYSIS DESCRIPTION .....</b>	<b>1</b>
<b>GENERAL CONTENTS.....</b>	<b>3</b>
IDENTIFICATION OF INTERESTS .....	3
VIOLATION INFORMATION.....	3
RIGHT OF ENTRY .....	3
LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS.....	4
PERMIT TERM.....	4
PUBLIC NOTICE AND COMMENT .....	5
FILING FEE .....	5
PERMIT APPLICATION FORMAT AND CONTENTS .....	5
REPORTING OF TECHNICAL DATA .....	6
MAPS AND PLANS .....	6
COMPLETENESS.....	7
<b>ENVIRONMENTAL RESOURCE INFORMATION .....</b>	<b>9</b>
GENERAL.....	9
PERMIT AREA .....	9
HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION.....	9
CLIMATOLOGICAL RESOURCE INFORMATION .....	10
VEGETATION RESOURCE INFORMATION .....	10
FISH AND WILDLIFE RESOURCE INFORMATION .....	13
SOILS RESOURCE INFORMATION.....	16
LAND-USE RESOURCE INFORMATION.....	16
ALLUVIAL VALLEY FLOORS .....	17
Alluvial Valley Floor Determination .....	17
Applicability of Statutory Exclusions.....	17
PRIME FARMLAND .....	17
GEOLOGIC RESOURCE INFORMATION .....	17
HYDROLOGIC RESOURCE INFORMATION .....	20
Sampling and Analysis .....	20
Baseline Information.....	21
Baseline Cumulative Impact Area Information .....	22
Modeling.....	23
Probable Hydrologic Consequences Determination .....	23
Groundwater Monitoring Plan .....	23
Surface-Water Monitoring Plan.....	25
<b>MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION.....</b>	<b>26</b>
Affected Area Boundary Maps .....	26
Archeological Site Maps.....	26
Coal Resource and Geologic Information Maps.....	26
Cultural Resource Maps.....	27
Existing Structures and Facilities Maps.....	27
Existing Surface Configuration Maps.....	27
Mine Workings Maps .....	27
Monitoring and Sampling Location Maps .....	27

## TABLE OF CONTENTS

---

Permit Area Boundary Maps .....	29
Subsurface Water Resource Maps .....	29
Surface and Subsurface Manmade Features Maps .....	29
Surface and Subsurface Ownership Maps .....	29
Surface Water Resource Maps .....	29
Vegetation Reference Area Maps .....	29
Well Maps .....	29
<b>OPERATION PLAN .....</b>	<b>31</b>
MINING OPERATIONS AND FACILITIES .....	31
EXISTING STRUCTURES: .....	31
PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES .....	32
RELOCATION OR USE OF PUBLIC ROADS .....	32
AIR POLLUTION CONTROL PLAN .....	32
COAL RECOVERY .....	32
SUBSIDENCE CONTROL PLAN .....	34
Renewable Resources Survey .....	34
Subsidence Control Plan .....	34
Performance Standards For Subsidence Control .....	36
Notification .....	36
SLIDES AND OTHER DAMAGE .....	36
FISH AND WILDLIFE INFORMATION .....	36
Protection and Enhancement Plan .....	37
Endangered and Threatened Species .....	37
Bald and Golden Eagles .....	38
Wetlands and Habitats of Unusually High Value for Fish and Wildlife .....	38
TOPSOIL AND SUBSOIL .....	39
Topsoil Removal and Storage .....	39
VEGETATION .....	39
ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES .....	40
Road Classification System .....	40
Plans and Drawings .....	40
Performance Standards .....	40
Primary Road Certification .....	40
Other Transportation Facilities .....	40
SPOIL AND WASTE MATERIALS .....	41
Disposal Of Noncoal Mine Wastes .....	41
Coal Mine Waste .....	41
Refuse Piles .....	41
Impounding Structures .....	41
Burning And Burned Waste Utilization .....	41
Return of Coal Processing Waste to Abandoned Underground Workings .....	41
Excess Spoil .....	41
HYDROLOGIC INFORMATION .....	42
General .....	42

## TABLE OF CONTENTS

---

Groundwater Monitoring .....	42
Surface Water Monitoring .....	43
Acid- and Toxic-Forming Materials and Underground Development Waste .....	44
Transfer of Wells .....	44
Discharges Into An Underground Mine.....	44
Gravity Discharges From Underground Mines.....	44
Water-Quality Standards And Effluent Limitations .....	44
Diversions: General .....	44
Diversions: Perennial and Intermittent Streams .....	44
Diversions: Miscellaneous Flows .....	45
Stream Buffer Zones .....	45
Sediment Control Measures.....	45
Siltation Structures: General .....	45
Siltation Structures: Alternative Sediment Control Areas (ASCAs) .....	46
Siltation Structures: Sedimentation Ponds.....	46
Siltation Structures: Other Treatment Facilities .....	47
Siltation Structures: Exemptions.....	47
Discharge Structures .....	47
Impoundments.....	47
Ponds, Impoundments, Banks, Dams, and Embankments.....	48
SUPPORT FACILITIES AND UTILITY INSTALLATIONS.....	48
SIGNS AND MARKERS .....	48
USE OF EXPLOSIVES.....	48
General Requirements.....	49
Preblasting Survey .....	49
General Performance Standards.....	49
Blasting Signs, Warnings, And Access Control .....	49
Control of Adverse Effects .....	49
Records of Blasting Operations .....	49
MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS.....	49
Affected Area Maps.....	49
Mining Facilities Maps .....	49
Mine Workings Maps .....	50
Monitoring and Sampling Location Maps .....	50
<b>RECLAMATION PLAN.....</b>	<b>51</b>
GENERAL REQUIREMENTS .....	51
POSTMINING LAND USES.....	51
PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES...	51
APPROXIMATE ORIGINAL CONTOUR RESTORATION.....	52
BACKFILLING AND GRADING.....	52
General.....	52
Previously Mined Areas.....	52
Backfilling and Grading On Steep Slopes .....	52
Special Provisions for Steep Slope Mining .....	52

## TABLE OF CONTENTS

---

MINE OPENINGS.....	53
TOPSOIL AND SUBSOIL.....	53
Redistribution.....	53
ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES .....	53
Reclamation .....	53
Retention .....	54
HYDROLOGIC INFORMATION .....	54
Hydrologic Reclamation Plan.....	54
CONTEMPORANEOUS RECLAMATION .....	54
General.....	54
REVEGETATION .....	54
Revegetation: General Requirements .....	55
Revegetation: Timing.....	56
Revegetation: Mulching and Other Soil Stabilizing Practices.....	56
Revegetation: Standards For Success .....	56
STABILIZATION OF SURFACE AREAS .....	59
CESSATION OF OPERATIONS.....	59
MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS .....	59
Affected Area Boundary Maps .....	59
Bonded Area Map .....	60
Reclamation Backfilling And Grading Maps .....	60
Reclamation Facilities Maps.....	60
Final Surface Configuration Maps.....	60
Reclamation Monitoring And Sampling Location Maps.....	60
Reclamation Surface And Subsurface Manmade Features Maps .....	60
Reclamation Treatments Maps .....	61
Certification Requirements. ....	61
BONDING AND INSURANCE REQUIREMENTS.....	61
General.....	61
Form of Bond.....	61
Determination of Bond Amount .....	61
Terms and Conditions for Liability Insurance .....	61
<b>REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING .....</b>	<b>63</b>
INTRODUCTION .....	63
EXPERIMENTAL PRACTICES MINING .....	63
MOUNTAINTOP REMOVAL MINING.....	63
Special Permanent Program Performance Standards--Mountaintop Removal.....	63
STEEP SLOPE MINING.....	64
PRIME FARMLAND .....	64
Prime Farmland Application Contents.....	64
Consultation with Secretary of Agriculture .....	64
Issuance of Permit.....	64
Soil Removal and Stockpiling .....	64
Soil Replacement .....	64

## TABLE OF CONTENTS

---

Revegetation and Restoration of Soil Productivity.....	65
COAL PREPARATION PLANTS NOT LOCATED WITHIN THE PERMIT AREA OF A MINE .....	65
OPERATIONS IN ALLUVIAL VALLEY FLOORS.....	65
Essential Hydrologic Functions .....	65
Protection of Agricultural Activities.....	65
Monitoring .....	65
IN SITU PROCESSING.....	66
AUGER MINING.....	66
<b>CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA).....</b>	<b>67</b>
<b>APPENDICES .....</b>	<b>69</b>
SUMMARY OF COMMITMENTS.....	71
PERMIT INFORMATION TABLE.....	73

## TABLE OF CONTENTS

---

## TECHNICAL ANALYSIS DESCRIPTION

The Division ensures that coal mining and reclamation operations in the State of Utah are consistent with the Coal Mining Reclamation Act of 1979 (Utah Code Annotated 40-10) and the Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87). The Utah R645 Coal Mining Rules are the procedures to implement the Act. The Division reviews each permit or application for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Applicant/Permittee must comply with all the minimum regulatory requirements as established by the R645 Coal Mining Rules.

The regulatory requirements for obtaining a Utah Coal Mining Permit are included in the section headings of the Technical Analysis (TA) for reference. A complete and current copy of the coal rules can be found at <http://ogm.utah.gov>

The TA is organized into section headings following the organization of the R645-Coal Mining Rules. The Division analyzes each section and writes findings to indicate whether or not the application is in compliance with the requirements of that section of the R645-Coal Mining Rules.



Page 2

C/015/032

January 20, 2006

## **TECHNICAL ANALYSIS DESCRIPTION**

---

## **GENERAL CONTENTS**

---

# **GENERAL CONTENTS**

## **IDENTIFICATION OF INTERESTS**

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

### **Analysis:**

Identification of Interests, found in section 1.12, Chapter 1 - Volume 1 of the MRP was updated with current information as part of the South Crandall Lease addition in January 2004.

### **Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Identification of Interests section of the regulations.

## **VIOLATION INFORMATION**

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

### **Analysis:**

Violation information has been updated with information through June 2005 with the submittal of the current MRP and subsequent permit amendments.

### **Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Violation Information section of the regulations.

## **RIGHT OF ENTRY**

Regulatory Reference: 30 CFR 778.15; R645-301-114

### **Analysis:**

The 120-acre Incidental Boundary Change (IBC) is an extension of federal lease UTU-68082. A copy of the lease addition is included, as appendix 1-15.

## **GENERAL CONTENTS**

---

The Division received a letter dated May 24, 2005 from Alice B. Carlton, Forest Supervisor for the USFS. The letter indicates that the USFS staff has reviewed and approved the application from Genwal Resources to modify the USFS trailhead parking area.

This area is covered under a special use permit issued by the USFS.

### **Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Right of Entry section of the regulations.

## **LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS**

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

### **Analysis:**

The IBC MRP includes documentation from the Bureau of Land Management (BLM) concerning the extension of federal lease UTU-68082.

### **Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Legal Description and Status of Unsuitability Claims section of the regulations.

## **PERMIT TERM**

Regulatory References: 30 CFR 778.17; R645-301-116.

### **Analysis:**

The current five (5) year permit term began May 13, 2003, and expires on May 13, 2008. The permit will need to be modified by DOGM to include the IBC when the MRP is approved.

### **Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Permit Term section of the regulations.

## **GENERAL CONTENTS**

---

February 3, 2006

### **PUBLIC NOTICE AND COMMENT**

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

#### **Analysis:**

The addition of an Incidental Boundary Change (IBC) is not subject to public notice or comment and no public notice has been submitted.

The USFS Trailhead area and disturbance lies within the existing permit area on Forest Service (USFS) property. The USFS has been contacted and meetings have been held to discuss the use of the USFS trailhead for additional parking by mine employees. The area is covered under a special use permit from the USFS. The USFS does not plan to re-issue the permit, but is sending a letter to the Division acknowledging their approval.

The addition of the parking area will increase the disturbed area by 0.01 acres. The area is small enough that public notice is not required.

#### **Findings:**

The information provided adequately addresses the minimum requirements of the General Contents – Public Notice and Comment section of the regulations.

### **FILING FEE**

Regulatory Reference: 30 CFR 777.17; R645-301-118.

#### **Analysis:**

#### **Findings:**

### **PERMIT APPLICATION FORMAT AND CONTENTS**

Regulatory Reference: 30 CFR 777.11; R645-301-120.

## **GENERAL CONTENTS**

---

### **Analysis:**

The permit format and contents of the Crandall Canyon No.1 Mine was significantly updated in May 1993 with the LBA #9 amendment. The MRP consists of eight (8) Volumes. The MRP has continued to be modified within the same format since 1993.

### **Findings:**

The information provided adequately addresses the minimum requirements of the General contents – Permit MRP Format and Contents section of the regulations.

## **REPORTING OF TECHNICAL DATA**

Regulatory Reference: 30 CFR 777.13; R645-301-130.

### **Analysis:**

The Permittee met the requirements for providing the technical data in forms required by the R645-Rules and the Division. [02022006]

### **Findings:**

The information in the MRP meets the reporting of technical data as stated in the R645-Rules.

## **MAPS AND PLANS**

Regulatory Reference: 30 CFR 777.14; R645-301-140.

### **Analysis:**

The maps in the MRP meet the minimum requirements as stated in the R645-Rules. [02022006]

### **Findings:**

The maps and plans in the MRP meet the general requirements of the R645-Rules.

---

**GENERAL CONTENTS**

---

**COMPLETENESS**

Regulatory Reference: 30 CFR 777.15; R645-301-150.

**Analysis:**

The MRP meets the completeness requirements of the R645-Rules. [02022006]

**Findings:**

The Permittee met the completeness requirements of the R645-Rules. [02022006]

Page 8  
C/015/0032  
February 3, 2006

## **GENERAL CONTENTS**

---

## ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

### GENERAL

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

#### Analysis:

The Permittee met the general requirements for environmental resources. The Division discusses how the specific requirements were met in the following sections.

#### Findings:

The Permittee met the requirements for environmental resource information as stated in the R645-Rules.

### PERMIT AREA

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

#### Analysis:

The information in the 120-acre IBC is adequate for the Division to identify the permit area expansion. The area for the 120-acre IBC is shown in Section 5.21.13 of the MRP. The 120-acre addition consists of W1/2NW1/4 and the NW1/4SW1/4 of Section 32 T. 15S R. 7E.

#### Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resource Information - Permit Area section of the regulations.

## HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.12; R645-301-411.



**Analysis:**

The MRP includes a cultural resource survey and inventory of the proposed 120-acre IBC addition to lease U-68082. The survey was prepared by Senco-Phenix, a private consulting firm. The survey findings indicated that there were no known cultural resources located within the proposed lease addition.

**Findings:**

The information provided adequately addresses the minimum requirements of the Environmental Resource Information – Historic and Archeological Resource Information section of the regulations.

**CLIMATOLOGICAL RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.18; R645-301-724.

**Analysis:**

The 0.01 acre of a southeast facing slope at the west end of the Forest Service Trailhead parking lot will be disturbed to facilitate parking at the trailhead. Plate 2-1 Soil Types Study Map places the soils in Map Unit in JDE (Jodero Variant- Datino Complex 5 – 20% slopes. The representative Datino soil pedon was located in the vicinity of the trailhead (Appendix 2-3, pedon No. 1). This soil is classified as Loamy-skeletal, mixed Cumulic Haploboroll, a very bouldery loam. The description indicates that there is a nine-inch topsoil layer (brown in color). The underlying C horizons extend to a depth of sixty inches. There is about the same rock content in the A horizon as the C horizon.

The underlying C horizons have a higher sand content and are lower in nutrient content (nitrogen, phosphorus and potassium).

**Findings:**

The information available in the MRP meets the Environmental Soil Resource requirements of the Regulations.

**VEGETATION RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.19; R645-301-320.

**ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

**Analysis:**

The vegetation resource information is provided for in chapter three of the MRP. Text changes for the 120-acre IBC addition to lease U-68082 include pages 3-iv, 3-1, 3-7, 3-8, and 3-9. Additional appendices include 3-16 and 3-16A. Revised maps include plates 3-1A, B, and C and 3-2. Crandall Canyon contains ten vegetative communities. Six of these occurred in areas that have been disturbed. These communities were classified as cottonwood, sagebrush, mountain shrub/grassland, mixed mountain shrub/conifer/aspen, spruce/fir/aspen, and riparian. Also, portions of the disturbed area were previously disturbed. Appendix 3-1 contains details of the original vegetation sampling.

Genwal Resources Inc. committed to take aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation. Photographs were taken in 1985, 89, 94 and 2000. The 1994 and 2000 photos were chosen for comparison. The evaluation was completed by Pat Collins from Mt. Nebo Scientific and included in the 2001 annual report. The conclusions suggest that there were no noticeable impacts on vegetation as a result of mining within the angle of draw.

The MRP also contains a report from Environmental Industrial Services about the vegetation in the riparian area. Included is a vegetation survey of north-facing slopes done in 1996 by Patrick Collins of Mt. Nebo Scientific. The current mining and reclamation plan contains vegetation information gathered in 1980 including the riparian area. One of the dominant grasses in the 1994 sampling of the riparian area was downy brome, but this grass was not present in any areas, including the previously disturbed area, before the mine was reopened. It is unlikely this grass would have invaded on its own without some disturbance.

There are 7 threatened or endangered and candidate plant species identified in the U. S. Fish and Wildlife Service October 2004 listing for Emery County. They include:

Barneby Reed-mustard	<i>Schoenocrambe barnebyi</i>	E
Jones Cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>	T
Last Chance Townsendia	<i>Townsendia aprica</i>	T
Maguire Daisy	<i>Erigeron maguirei</i>	T
San Rafael Cactus	<i>Pediocactus despainii</i>	E
Winkler Cactus	<i>Pediocactus winkleri</i>	T
Wright Fishhook Cactus	<i>Sclerocactus wrightiae</i>	E

Several more sensitive species are listed for the Manti La Sal National Forest:

- Chatterley Onion *Allium geyeri chatterleyi*
- Sweet-flowered rock jasmine *Androsace chamaejasme carinata*

- Link Trail columbine *Aquilegia flavescens rubicunda*
- Bicknell Milkvetch *Astragalus consobrinus*
- Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*
- Pinnate spring-parsley *Cymopterus beckii*
- Abajo daisy *Erigeron abajoensis*
- Carrington daisy *Erigeron carringtonae*
- Kachina daisy *Erigeron kachinensis*
- LaSal daisy *Erigeron mancus*
- Canyonlands lomatium *Lomatium latilobum*
- Canyon sweetvetch *Hedysarum occidentale* var. *canone*
- Arizona willow *Salix arizonica*
- Musinea groundsel *Senecio musiniensis*
- Maguire campion *Silene petersonii*

The MRP has been updated to include these current listings.

There are no threatened or endangered plant species known for the area according to information from Bob Thompson of the Forest Service, and no threatened or endangered plant species were encountered in the vegetation survey. However, at least two sensitive species have been found in the general vicinity. Canyon sweetvetch (*Hedysarum occidentale* var. *canone*) is present in Huntington Canyon near the turnoff to Crandall Canyon. Intermountain bitterweed (*Hymenoxys helenioides*) has been collected in Carbon and Emery Counties in mountain brush, sagebrush, aspen, and meadow communities between 8800 and 10,700 feet elevation. The permit area probably contains suitable habitat for this species, but it is unlikely to be adversely affected.

A reference area has been established in a mountain shrub/grassland community on a south-facing slope above the mine, and one in a spruce/fir/aspen community on the north-facing slope. The South Crandall lease area is primarily in riparian and spruce/fir/aspen communities.

Adequate numbers of samples were taken for the riparian and spruce/fir/aspen areas. However, the required sample size for the naturally disturbed areas is 19.5 although only 12 samples were taken. Not meeting the minimum sample size is not a problem unless the applicant proposes to use the baseline information as a success standard for final bond release.

Since baseline information will be used as the revegetation success standard for the riparian areas, the MRP includes raw data for the riparian area sampling. This data is needed when comparing for final bond release to make a pooled standard deviation. Depending on the sampling distribution of the data, it might also be necessary to transform it, and the raw data would be needed for this purpose.

## **ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

Woody plant density information is in reports from Mt. Nebo Scientific in Appendices 3-11 and 3-14. Measured woody plant densities were 11224 and 11989 per acre for the riparian and non-riparian areas respectively.

The MRP contains productivity information for the different plant communities and for the spruce/fir/aspen reference area. This information is commonly gathered using Natural Resources Conservation Service methods.

The location of the spruce/fir/aspen reference area is shown on Plate 2-4.

### **Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

## **FISH AND WILDLIFE RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 784.21; R645-301-322.

### **Analysis:**

Fish and wildlife information is presented in Section 3.22 and in Appendixes 3-2 and 3-3. Updates to chapter three for lease addition UTU-78953, include appendixes 3-16 and 3-17, and plates 3-1A, B, and C, 3-2 and 4-1. The MRP also contains results from several studies, including macroinvertebrate studies done in 1980 and 1994; fish and stream investigations performed in 1982, 1983, 1994, and 1995; several raptor surveys; and a survey for all birds in the area of the current portal development. A 2003 raptor survey is included in the new lease addition as appendix 3-16. It is identified in the table of contents but not in the MRP. A 2004 raptor survey is also included in the MRP and is properly identified as appendix 3-16A.

The current disturbed areas contain some habitat for big game animals. Primary summer ranges are on the plateaus, and most winter range areas are at lower elevations than the mine. Both the South Crandall lease and 120-acre IBC addition to U-68082 MRP's contain mostly summer range for deer and elk with some moose winter range along the north lease boundary. Both additions to the permit area include critical value summer deer and elk and high value winter moose habitats.

Most of the permit area does not contain good cliff nesting habitat, but there are a few areas with golden eagle nests. A pair of eagles nested in a cliff above the mine in 1995. Raptor nests are shown on Plate 3-1A and on a map submitted as an addendum to Appendix 3-3. The map in the addendum contains results from the 1996 survey. The 2003 and 2004 raptor surveys are included as appendixes 3-16 and 3-16A for the new lease area. The surveys indicate that

there are no active nests within ½ mile of both the South Crandall lease area and the 120-acre IBC addition to U-68082 area.

Appendix 3-3 contains a 1980 report that discusses accipiters in Crandall Canyon. The report has evidence of past nesting and hunting activity, but no birds have been found in more recent searches. However, Crandall Canyon and similar canyons in the Huntington Creek area should be considered good accipiter habitat.

A list of twenty-two bird species identified by the Fish and Wildlife Service as migratory birds of high federal interest is in Appendix 3-3. Section 3.22.21 lists seven of these species that have the potential of migrating within the region where the mine is located.

Table 5 in Appendix 3-3 has a list of reptile and amphibian species that may be found in the area according to published information. Reptiles are found throughout the permit area, but amphibians are only associated with water. The MRP says baseline studies in the spring of 1994 did not encounter any threatened or endangered reptiles or amphibians. More detail of this work is in an addendum to Appendix 3-2. The MRP contains studies of macroinvertebrates and fish populations in Crandall Creek from 1994. In response to comments from the Forest Service, the permittee has committed to inventory macroinvertebrate populations in the creek every three years.

Appendix 3-2 and Section 3.22.1 discuss the importance of Crandall Creek as fish habitat. One of the recommendations in a 1982 report from Walter Donaldson, regional fish manager for the Division of Wildlife Resources, was to occasionally blow up beaver dams as they tend to accumulate silt and deter upstream trout movement. However, April 1, 1996, correspondence from the Forest Service says beaver dams are rarely barriers to fish passage. Cutthroat trout spawn during high water periods in the spring when they can swim over the dams. In March 8, 1996, correspondence to the Division, Wildlife Resources said, for its size, Crandall Creek contains a significant population of resident fish and provides a significant spawning ground/nursery.

In three years of surveys, the Division of Wildlife Resources has not found fish above a beaver pond just above the mine. However, the Forest Service in February 5, 1997, correspondence said the surveys done in 1995 were taken in late June and August and do not give any kind of picture of the function of the higher reaches of the creek for the cutthroat population. The correspondence also says the culvert would cause a significant loss of habitat and will affect the population's ability to access headwaters.

Appendix 3-10 is a memorandum from Marvin Boyer and Pete Cavalli of the Division of Wildlife Resources concerning a fish population survey done in 1996 with some data from 1994 and 1995 surveys. This document says the data strongly suggest that the middle reach of Crandall Creek, the area near the mine, is an important spawning and nursery area. It also says

**ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

preliminary results of sampling for genetic study indicates the fish are a pure strain of Colorado River cutthroat trout.

**Threatened or Endangered Species**

There are 9 threatened or endangered and candidate wildlife species identified in a U. S. Fish and Wildlife Service October 2003 listing for Emery County. They include:

Bonytail <sup>4,10</sup>	<i>Gila elegans</i>	E
Colorado Pikeminnow <sup>4,10</sup>	<i>Ptychocheilus lucius</i>	E
Humpback Chub <sup>4,10</sup>	<i>Gila cypha</i>	E
Razorback Sucker <sup>4,10</sup>	<i>Xyrauchen texanus</i>	E
Bald Eagle <sup>1</sup>	<i>Haliaeetus leucocephalus</i>	T
Mexican Spotted Owl <sup>1,4</sup>	<i>Strix occidentalis lucida</i>	T
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C
Black-footed Ferret <sup>6</sup>	<i>Mustela nigripes</i>	E
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	E

<sup>1</sup> Nests in this county of Utah.

<sup>4</sup> Critical habitat designated in this county.

<sup>6</sup> Historical range.

<sup>9</sup> Candidate species have no legal protection under the Endangered Species Act. However, these species are under active consideration by the Service for addition to the Federal List of Endangered and Threatened Species and may be proposed or listed during the development of the proposed project.

<sup>10</sup> Water depletions from *any* portion of the occupied drainage basin are considered to adversely affect or adversely modify the critical habitat of the endangered fish species, and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

Of the 9 species, only one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting.

In addition to the species discussed in the MRP, there is also a potential to affect the threatened and endangered fish of the upper Colorado River basin through surface water depletion.

The MRP includes an updated list of the current T&E wildlife species for the 120-acre IBC addition to lease U-68082. The MRP lists those species that may occur in Emery County and it contains a separate list of those species that are known or suspected of being in the Manti La Sal National Forest.

The MRP lists five sensitive species potentially present in the mine's area of influence. As discussed above, the Division of Wildlife Resources has recently (1997) preliminarily identified Colorado River cutthroat trout from Crandall Creek through genetic tests. However, the tests are not conclusive. If the fish in Crandall Creek are Colorado River cutthroats, it is very significant because this would be the only known population of Colorado River cutthroat trout in the Wasatch Plateau. It would indicate there is a barrier to fish passage that keeps Yellowstone cutthroats from coming up Crandall Creek from the Huntington River. Neither the South Crandall lease nor the 120-acre IBC addition would affect the fish populations in the Crandall Canyon watershed.

Another sensitive species, the goshawk, was found near the old portals in 1980. This information is contained in a wildlife inventory report for the original MRP. It is almost certain other goshawks nest in the permit area. The current raptor survey confirms that there are no goshawks nesting within the proposed South lease addition.

**Findings:**

The information provided is adequate to address the minimum requirements of this section of the regulations.

**SOILS RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

**Analysis:**

**Findings:**

**LAND-USE RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.22; R645-301-411.

---

**ENVIRONMENTAL RESOURCES INFORMATION**

---

February 3, 2006

**Analysis:**

**Findings:**

**ALLUVIAL VALLEY FLOORS**

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

**Analysis:**

**Alluvial Valley Floor Determination**

**Applicability of Statutory Exclusions**

**Findings:**

**PRIME FARMLAND**

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

**Analysis:**

**Findings:**

**GEOLOGIC RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

**Analysis:**

There is geologic information in the current MRP for the permit and adjacent areas, including the South Crandall Canyon Extension (with the 40-acre SITLA-PacifiCorp sub lease) and IBC addition to lease U-68082. Geologic information was added with the submittal for the South Crandall Canyon Extension, but other than information from adjacent mine workings, geologic data for the IBC addition to lease U-68082 area are sparse: the nearest borehole, DH-2, is located roughly one-half mile north of the IBC boundary.

*Test borings and coal sampling; coal seams, overburden, and strata*



Drill hole and geological information for the South Crandall Canyon Tract has been added on pages 6-5 and 6-5a. HC-4, the only borehole in the South Crandall Canyon tract, provides information on coal seam thicknesses (driller's log in Appendix 6-6).

The lowest coal seam in the Blackhawk Formation is the Hiawatha, characteristically on or just above the Star Point Sandstone. This seam has been mined in the Cottonwood/Wilberg, Deer Creek, Des-Bee-Dove, Huntington #4, and Genwal #1 Mines. The Hiawatha Seam thins to less than 5 feet in the north end of the Cottonwood/Wilberg Mine, but then thickens again to the north. The Hiawatha Seam reaches a thickness of 12 feet in the Crandall Canyon permit area, located mainly north and west of the #1 Mine portal. For the Hiawatha Seam in the South Crandall Canyon Tract and IBC addition to lease U-68082, thickness of the coal seam and cover are shown with contour lines on Plate 5-2 (H). Hiawatha to Blind Canyon interburden thicknesses are noted at the borehole locations. Hiawatha Seam thickness and cover for the Crandall Canyon #1 Mine area are on Plates 6-3 and 6-6.

The Blind Canyon Seam lies approximately 40 to 100 feet above the Hiawatha Seam. The Blind Canyon Seam has been mined in the Deer Creek, Huntington #4, and Des-Bee-Dove Mines, but is too thin to mine economically at the Cottonwood/Wilberg Mines. The Permittee states in Section 6.22.2 that the thickness of the Blind Canyon Seam is, respectively, 59 and 40 inches at in-mine drill holes DH-1 and DH-2 (although Plates 5-2 (H) and (BC) indicate a thickness of 56 inches at both drill holes) and 54 and 40 inches in surface drill-holes DH-3 and DH-4. On Plate 6-4, the Permittee has mapped a relatively small area (60 acres according to the text but the map shows approximately 150 acres) where the Blind Canyon Seam has a thickness of 5 feet or more. The Permittee concludes that the Blind Canyon Seam does not contain sufficient coal (approximately 418,000 tons) for economic mining in the vicinity of the #1 Mine.

The Blind Canyon Seam will be mined in the South Crandall Canyon Extension, where it is thicker. For the Blind Canyon Seam in the South Crandall Canyon tract, thickness of the coal seam and cover are shown on Plate 5-2 (BC), along with the Hiawatha to Blind Canyon interburden thickness. Plate 5-2 (BC) shows that the seam is just less than 5 feet thick at HC-4 but thickens to the west. Blind Canyon Seam thickness for the Crandall Canyon #1 Mine area is on Plate 6-4.

The Bear Canyon Seam is too thin to mine economically in both the Crandall Canyon #1 Mine and the South Crandall Canyon Tract. Plate 6-5 is the Bear Canyon Seam thickness isopach map for the #1 Mine area. The Bear Canyon Seam is only 2 feet thick in borehole HC-4 (Appendix 6-6), the only borehole in the South Crandall Canyon Tract.

There is little or no thickness information for the Blind Canyon and Bear Canyon Seams for areas in or adjacent to the IBC addition to lease U-68082: the small size of the IBC area and the absence of access through adjacent workings indicate recovery of coal from these seams, even if thick coal were present, would probably not be economic. Although Plates 6-4 (Blind

**ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

Canyon Seam Thickness) and 6-5 (Bear Canyon Seam Thickness) cover the area of this lease addition, these plates have not been updated to show the lease addition boundary. Plate 6-7, Hiawatha Structure, also does not show the boundary.

Test Borings and Coal Sampling information (section 6.22.1, pages 6-4 and 6-5) includes coal quality for both the Hiawatha and Blind Canyon Seams. Borehole HC-4 is the source of information for the South Crandall lease. Section 6.22.2 on page 6-5 includes information on coal reserves and on the nature, depth, and thickness of coal seams, rider seams, overburden, and interburden. Appendices 6-1, 6-5, and 6-6 contain additional geologic information. Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). Reference is made in several places to Plate 5-2, which can be understood to cover 5-2 (H) and 5-2 (BC).

The first paragraph on page 6-6 refers to the State leases only, so the information regarding the coal seams in the State leases is sufficient.

*Acid- and toxic-forming materials*

For the Crandall Canyon #1 Mine, acid- and toxic-forming characteristics for strata immediately over and under the Hiawatha and Blind Canyon Seams in the #1 Mine area are discussed on pages 6-8 and 6-9. Analysis results for the Hiawatha coal also are discussed on page 6-9. The Permittee has not provided analyses for acid- and toxic-forming characteristics for the Blind Canyon Seam, in either the #1 Mine area or the South Crandall Canyon Tract. The Permittee states on page 6-9 of the proposed amendment that there is currently no access to unweathered Blind Canyon materials (the cores taken in 1981 at HC-4 are apparently not available for analysis); however, coal and adjacent strata will be analyzed when the rock tunnels reach the Blind Canyon Seam.

*Engineering properties - clays and soft rock*

According to section 6.24.34 on page 6-9, strata immediately above and below the "seam to be mined" do not contain clays or soft rock. Those statements are based on information in Appendices 6-1 and 6-5 and apply to the Hiawatha Seam only.

The lithology log of HC-4 in Appendix 6-6 shows the thickness of the claystone and shale immediately above and below the Blind Canyon Seam. There is currently no access to unweathered materials for analysis. Engineering properties will be determined after rock tunnels are constructed to the Blind Canyon Seam. The Blind Canyon Seam is not thick enough to allow the leaving of thick layers of coal on the roof and floor, and soft rock in the roof and floor increases the probability that there will be waste rock that will need to be disposed of.

*Geologic information pertaining to hydrology (Little Bear Spring in particular)*

Because of concerns from the US Forest Service that full extraction mining would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon, and Appendix 7-63 has been added.

Location coordinates of seep and springs and field quality and quantity data are tabulated in Appendix 7-63. The Hiawatha and Blind Canyon Seam maps show the relation of the streams, springs, and seeps to the projected workings and where there is 600 feet of cover above the seam. The Geology map shows the location of seeps and springs in relation to the contact between the Price River and Blackhawk Formations.

Little Bear Spring is located adjacent to the South Crandall Canyon Tract, and Castle Valley Special Service District (CVSSD) has great concerns about protecting this important water supply from mining related damage. Information on how geology may affect the occurrence, availability, movement, quantity and quality of potentially impacted surface and ground water in the South Crandall Canyon Tract and adjacent areas was studied extensively before the South Crandall Canyon lease was issued. Using these studies, the BLM and the Manti-La Sal National Forest concluded that mining in the South Crandall Canyon Tract has a low potential to disrupt Little Bear Spring, and they signed a FONSI in February 2003. Copies of the reports prepared from these studies are included in the proposed amendment as appendices to Chapter 7, and the appendices number and title are listed on page 6-7a.

#### **Findings:**

The information provided adequately addresses the minimum requirements of the Environment Resource Information – Geologic Resource Information section of the regulations.

### **HYDROLOGIC RESOURCE INFORMATION**

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

#### **Analysis:**

##### **Sampling and Analysis**

The MRP for the Crandall Canyon No. 1 Mine includes the monitoring of fourteen springs, five stream locations, eleven groundwater wells (only two of which have not been either sealed off or destroyed), and two UPDES sites. The Permittee has added eight spring and six stream monitoring locations for the South Crandall Lease area to their water-monitoring

**ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

program. Two springs and one stream monitoring location have been added for the 120-acre IBC addition to U-68082 area. As stated in Section 7.2, Sampling and Analysis, of the mines existing MRP, "all water samples are collected and analyzed according to methods in either the "Standard Methods for the Examination of Water and Waste Water" or the 40 CFR parts 136 and 434".

**Baseline Information**

A description of the hydrologic and geologic characteristics of the Crandall Canyon Mine permit area, the South Crandall lease area and the additional 40-acre sublease area (part of the South Lease), and the 120-acre IBC addition to U-68082 areas are included in Section 7.24.1, Groundwater Information, and Section 7.24.2, Surface Water Information. Spring and seep surveys were conducted in and adjacent to the permit area in 1985, 1987, 1989, and 1993. Baseline spring and seep information is provided in Appendices 7-16 through 7-20. Baseline surface flow information provided from a USGS gauging station located at the mouth of Crandall Canyon Creek from 1978 through 1984 is presented in Appendix 7-2 and provided from Parshall flumes and instantaneous stream flow measurements from Crandall Canyon, Blind Canyon, Horse Canyon, and Indian Creek are presented in Appendix 7-23. Baseline information of the premining groundwater and surface water features within and adjacent to the South Crandall lease area and the U-68082 Lease Addition area are included in Appendix 7-58 and 7-64, respectively.

Appendix 7-58 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1980. Little Bear Spring and Little Bear Creek have been monitored since 1957 and 1970, respectively. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site. Major ion, trace metal, and nutrient water quality data collected by Genwal in June and August, 2003, are also presented for the four springs and six surface water monitoring sites that were included in the Genwal's original amended water monitoring program for the South Crandall lease area and the additional 40-acre sublease area (portion of the South Lease area). Because of USFS concerns of certain seeps and springs associated with riparian vegetation in Little Bear Canyon, several seeps and springs were added to the monitoring program (LB-7, LB-7A, LB-7B, LB-7C, and LB-12) and one spring was removed (LB-2). These additional seeps and springs were not part of the baseline study reported in Appendix 7-58. However, quarterly monitoring of these springs will begin in 2005 assuring that at least two years of seasonal monitoring (flow and field parameters) of these springs will be acquired prior to mining beneath Little Bear Canyon.

Supplemental hydrologic information has been added as Appendices 7-52 through 7-57, and 7-59 through 7-62 to address the complex hydrogeology of Little Bear Spring. Little Bear Spring is an important municipal water source and is located approximately 600 feet south of the South Crandall Lease Area in Little Bear Canyon. These appendices are scientific studies

that describe, among other things, the groundwater systems encountered in the Crandall Canyon mine, their relation to Little Bear Spring, and the potential source of water for the spring. The Division agrees with the Permittee's assessment that the studies indicate that Little Bear Spring is recharged primarily through surface water and alluvial groundwater losses in Mill Fork Canyon. This position is supported by the USFS/BLM Joint Decision Notice/Finding of No Significant Impact, Coal Lease MRP UTU-78953.

However, the Forest Service has commented that the hydrologic studies have not conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The Forest Service bases their comment on earlier studies of the spring (pre-1998) suggesting a north and west source area that was not eliminated as a possibility in later studies. The MRP addresses the Forest Service comment and references pre-1998 studies that suggest a northerly component of flow feeding Little Bear Spring. Because these studies are not the property of Genwal, the Division will keep these studies available for review in the Division's Public Information Center.

Baseline information of the premining groundwater and surface water features within and adjacent to the proposed 120-acre IBC addition to U-68082 is included as Appendix 7-64, Baseline Information for the 120-acre IBC addition to U-68082. Appendix 7-64 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1985. Baseline monitoring of the seeps and springs was collected during June and October 1985, June and September/October 1993, and May 2004. Shingle Creek was monitored during May, June, and July of 2004. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site including the two springs (SP-18 and SP-22) and Shingle Creek added to the monitoring program.

The listing of water rights in and adjacent to the permit boundary, as obtained from the Utah Division of Water Rights, has been updated for the South Crandall lease area and the 102-acre IBC addition to lease U-68082 on the groundwater and surface water rights maps (Plates 7-14 and 7-15, respectively), the tabulated listing of surface water rights (Table 7-6), and the supporting water rights information (Appendix 7-1).

#### **Baseline Cumulative Impact Area Information**

The Division has updated the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Addition area (March 28, 2005). Hydrogeologic information provided by the amendments was adequate for the Division to complete the update.

**ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

**Modeling**

A conceptual recharge model of Little Bear Spring is presented as Appendix 7-55, Investigation of the Potential for Little Bear Spring Recharge in Mill Fork Canyon, Emery County, Utah. The model uses information obtained from studies presented in other appendices including two isotopic studies, an in-mine slug test, a resistivity study, hydrogeologic information, and historical flow data. In addition, a dye tracing study and three electromagnetic (AquaTrack) studies of the Little Bear Spring recharge system are presented in the appendices. Combined, these studies make a compelling argument that the primary source of recharge to Little Bear Spring is through surface water and alluvial groundwater losses in Mill Fork Canyon.

**Probable Hydrologic Consequences Determination**

The Probable Hydrologic Consequences Determination (PHC) (Appendix 7-15) has been updated to include reference to the 120-acre addition to lease U-68082 and the hydrologic, geologic, baseline, and supplemental information provided for the South Crandall lease area and the additional 40-acre sublease area of the South Crandall lease. No new information describing the probable hydrologic consequences of mining within the U-68082 Lease Addition area is presented except to mention that the drainages in the U-68082 lease addition are all ephemeral or intermittent. Updates in the PHC center around the recharge source to Little Bear Spring and the potential impacts of the proposed mine workings on the spring. Studies indicate that fractures in the Star Point Sandstone act as a conduit to provide surface and alluvial water from Mill Fork Canyon to Little Bear Spring. Because this fracture system lies outside of the South Crandall Lease permit boundary, and a regional Star Point aquifer does not likely contribute to the fracture system, then it is considered extremely unlikely that the proposed mining activities will impact the spring. In addition, the Star Point Formation will not be undermined by the proposed mining in the South Crandall Lease area or the 120-acre IBC addition to lease U-68082 because the coal seams proposed for mining are stratigraphically above the Star Point Formation.

As stated above (Hydrologic Resource Information, Baseline Information) the Forest Service has commented that the hydrologic studies have not conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The PHC addresses the Forest Service comment and references pre-1998 studies that suggest a northerly component of flow feeding Little Bear Spring. Because these studies are not the property of Genwal, the Division will keep these studies available for review in the Division's Public Information Center.

**Groundwater Monitoring Plan**

The groundwater monitoring plan has been updated to include the monitoring of eight springs and seeps located within and adjacent to the South Crandall lease area as shown on Plate

7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; springs LB-7, LB-7A, and LB-7B, that discharges from the base of the Castlegate Sandstone north slope of Little Bear Canyon; springs LB-7c, LB-5A, and LB-12 that discharges from a sandstone channels in the Blackhawk Formation in Little Bear Canyon; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

In order to conduct multiple seam mining beyond spring site LB-7, a monitoring plan must be submitted and approved by the Division in concurrence with the Forest Service at least two years prior to mining in that area. Multiple seam mining will therefore be contingent upon meeting this requirement.

Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, additional surveys are to be conducted in 2005 that include: a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and a detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. As a stipulation of the South Crandall lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Lessee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, PacifiCorp, and the Castle Valley Special Service District. The supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51.

The groundwater monitoring plan has been updated to include the monitoring of two springs and seeps (SP-18 and SP-22) located within the U-68082 Lease Mod Area as shown on Plate 7-18. According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the U-68082 Lease Mod Area, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the groundwater discharge at the springs would be diverted to the mine workings through mine-induced fractures, the Division did not recommend additional groundwater monitoring. However, the USFS owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water-monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The

**ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

Permittee has committed, at the Division's request, to a water-monitoring plan that includes quarterly monitoring for flow and field parameters of spring sites SP-18 and SP-22. Spring SP-22 issues from the Blackhawk Formation within the potential subsidence area of the 120-acre addition. Spring SP-18 issues from the Star Point Formation beneath the coal seam and outside of the potential subsidence boundary. The spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

**Surface-Water Monitoring Plan**

The surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the perennial Little Bear Canyon Creek (intermittent upstream of Little Bear Spring), the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek; the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

The surface water-monitoring plan has been updated to include the monitoring of Shingle Creek within the 120-acre IBC addition to lease U-68082 as shown on Plate 7-18. Shingle Creek is an intermittent creek that branches into a right and left fork at the east boundary of the lease mod area. Because Shingle Creek is intermittent, and only a portion of the upper reaches of the right and left forks flows within the potential subsidence area, no additional surface water monitoring was recommended by the Division. However, the Forest Service owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water-monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water monitoring plan that includes quarterly monitoring for flow and field parameters of a stream site for Shingle Creek located just downstream of spring site SP-18 and the confluence of the left and right forks of Shingle Creek. The creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.



**Findings:**

Hydrologic Resource Information meets the minimum requirements of the Environmental Resource Information – Hydrologic Resource Information section of the regulations.

**MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

**Analysis:**

**Affected Area Boundary Maps**

The Permittee shows the proposed affected area boundaries on Plate 5-2 (BC). The information is adequate for the Division to determine the affected area boundaries.

**Archeological Site Maps**

The archeological site map provided for in appendix 4-1A of the MRP does not include the South Crandall lease addition. However Appendix 4-9 of the MRP includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

**Coal Resource and Geologic Information Maps**

Plate 6-1, the geology map, and Plates 5-2 (H) and 5-2 (BC), the mine plan maps for the Hiawatha and Blind Canyon Seams, have been updated to include the 120-acre IBC addition to lease U-68082 and the South Crandall Canyon Extension. Although older maps such as 6-3, 6-4, 6-5, 6-6, and 6-7 are still in the MRP and provide valuable information for the #1 Mine, they have effectively been superseded by 6-1, 5-2 (H), and 5-2 (BC) in the area of the IBC and South Crandall Canyon Tract and do not need to be updated.

Plate 5-2 (H) shows Hiawatha Seam thickness and cover thickness in the IBC and South Crandall Canyon Extension. Mining projections on Plate 5-2 (H) show one east-west oriented longwall panel extending into the south end of the IBC. Projected subsidence from Hiawatha Seam mining in the IBC is shown on Plate 5-2 (H).

Plate 5-2 (BC) shows Blind Canyon Seam cover thickness, but coal thickness is not shown for this seam in this area: there is no thickness information for the Blind and Bear Canyon Seams in or near the IBC, and these seams will not be mined in the IBC area.

## **ENVIRONMENTAL RESOURCES INFORMATION**

February 3, 2006

The coal outcrop and strike and dip of the coal seams are on Plates 5-2 (H) and 5-2 (BC). Appendix 6-7 contains a generalized geologic cross-section that parallels the strike of the Mill Fork Graben and goes from Rilda Canyon and Mill Fork through the Huntington #4 Mine and Little Bear Spring to Huntington Canyon. Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.

### **Cultural Resource Maps**

The cultural resource map provided for in appendix 4-1A of the MRP did not include the South Crandall lease addition. However Appendix 4-9 of the MRP includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

### **Existing Structures and Facilities Maps**

The Permittee did not need to update the existing structures and facilities maps. Plate 1-1, Crandall Canyon Mine Lease Map, shows that the area is mountainous and that only structure that exists is a USFS trail. Plate 4-3, Crandall Canyon Mine Oil & Gas Development, does not show any activity in the South Crandall lease area.

### **Existing Surface Configuration Maps**

The Permittee shows the existing surface configuration on several maps including Plate 1-1, Crandall Canyon Mine Lease Map.

### **Mine Workings Maps**

Mine workings are shown on Plates 5-2 (H) and 5-2 (BC Map 5-1, Old Works Plate, shows the locations of the old workings in and around the Crandall Canyon Mine.

### **Monitoring and Sampling Location Maps**

Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs

related to this contact in Little Bear Canyon. Locations of seeps and springs are on the Hiawatha and Blind Canyon Seam maps in Appendix 7-63. In addition to Little Bear Spring, Genwal has added the monitoring of six other springs in this canyon; LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. Plates 7-12 and 7-18 have been updated with the correct identification and locations of the seeps and springs in Little Bear Canyon.

Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). There are no new water-monitoring points in the South Crandall lease, but the location of Little Bear Spring is on several maps.

Plate 7-12 shows the seep and spring locations for the Crandall Canyon mine and surrounding area. The baseline seep and spring locations for the South Crandall lease area and the 120-acre IBC addition to lease U-68082 area are shown on this plate as well as in Appendices 7-58 and 7-64, respectively. Plate 7-18 has been updated to show surface and groundwater monitoring locations for the South Crandall lease area and the 120-acre IBC addition to lease U-68082 area.

In order to clarify the locations of significant springs in relation to the geology and longwall mining projections in Little Bear Canyon watershed, topographic maps of the watershed have been provided (Appendix 7-63) that show the following:

- Surveyed locations and identity of all springs;
- The Hiawatha and Blind Canyon seam outcrop contours;
- The Blind Canyon seam 600-foot overburden contour;
- The Hiawatha and Blind Canyon seam mining projections; and
- Surface geology.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that a monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. Depending upon the monitoring program developed, additional maps or an update of existing maps will be provided by the Permittee as part of the monitoring plan. Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, additional surveys are to be conducted in 2005 that include: a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and a detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. These maps are to be included in the MRP following the 2005 field season.

---

**ENVIRONMENTAL RESOURCES INFORMATION**

---

February 3, 2006

**Permit Area Boundary Maps**

The permit area boundaries are shown on several maps including Plate 5-2 (BC) and Plate 5-2 (H).

**Subsurface Water Resource Maps**

Plate 7-14, Groundwater Rights, has been updated to include the South Crandall lease area, the associated additional 40-acre sublease area, and the U-68082 Lease Addition area.

**Surface and Subsurface Manmade Features Maps**

The Permittee met the requirements for this section by showing the surface and subsurface manmade features on Map 4-2, Land Use Map. [01302006]

**Surface and Subsurface Ownership Maps**

The Permittee met the requirements for this section by showing the surface ownership on Map 4-4, Surface Ownership and the subsurface ownership on Map 1-1, Lease Boundary Map. [01302006]

**Surface Water Resource Maps**

Plate 7-15, Surface Water Rights, has been updated to include the South Crandall lease area, the associated additional 40-acre sublease area, and the U-68082 Lease Addition area.

**Vegetation Reference Area Maps**

The MRP includes wildlife and vegetation maps for the proposed 120-acre lease addition. They are identified as plates 3-1A, B, and C and 3-2. Plate 3-2, (Regional Vegetation), has been revised to accurately reflect the vegetative communities and stream courses that are present in the canyon where the proposed IBC is located. Additional vegetative communities observed in the proposed lease addition were conifer, Pinyon Juniper Mountain Brush, Sagebrush, and riparian. Both forks of the canyon exhibited intermittent flow. Plates 3-1 and 3-2 appear to show perennial flow in the canyon and proposed lease area.

**Well Maps**

**Findings:**

The information provided is adequate to meet the requirements of this section of the regulations.

Page 30  
C/015/0032

February 3, 2006

**ENVIRONMENTAL RESOURCE INFORMATION**

---

## OPERATION PLAN

February 3, 2006

# OPERATION PLAN

## MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR 784.2, 784.11; R645-301-231, -301-526, -301-528.

### Analysis:

The Permittee met the rules covered in the Mining and Operations and Facilities section of the TA. The requirements of this section of the TA are that the Permittee provide general information about the life of mine, type of coal mining, anticipated annual and total production. That information is in Sections 526 and 528 of the MRP. Detailed descriptions of specific mining methods and equipment are found in the engineering section of the TA. [01302006]

### Findings:

The information contained in this section of the amendment meets the minimum requirements. [01302006]

## EXISTING STRUCTURES:

Regulatory Reference: 30 CFR 784.12; R645-301-526.

### Analysis:

Existing structures are required to be identified and listed in the approved Mining and Reclamation Plan (MRP). Three buildings used for the South Portal construction on a temporary basis are now permanent structures. Plate 5-3, Crandall Canyon Mine Surface Facilities Map, shows the location of these buildings, discussion in the MRP of their intended use, size and final disposition at the time of reclamation is located on page 5-29. [01202006]

### Findings:

The information contained in this section of the amendment meets the minimum requirements. [01202006]

## **PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES**

Regulatory Reference: 30 CFR 784.17; R645-301-411.

### **Analysis:**

### **Findings:**

## **RELOCATION OR USE OF PUBLIC ROADS**

Regulatory Reference: 30 CFR 784.18; R645-301-521, -301-526.

### **Analysis:**

The Permittee met the requirements of this section by describing in the permit USFS road in Section 5.26 of the MRP. Part of the USFS road is located within the disturbed area. The Permittee agreed to conditions to protect the public from hazards associated with the mining operations. [02022006]

### **Findings:**

The Permittee met the requirements for relocating or using a public road within the disturbed area. [02022006]

## **AIR POLLUTION CONTROL PLAN**

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

### **Analysis:**

### **Findings:**

## **COAL RECOVERY**

Regulatory Reference: 30 CFR 817.59; R645-301-522.

### **Analysis:**

Appendix 5-24, Resource and Recovery Protection Plan (R2P2) Approval Letter, is included in the amendment. The Division uses the R2P2 when evaluating the coal recovery plan.

## OPERATION PLAN

February 3, 2006

In addition to the approval letter the Permittee needs to state in the amendment what they are doing to maximize coal recovery.

The Permittee plans to mine both seams in the South Crandall Canyon Lease Extension, as shown on Plate 5-2 (H) and Plate 5-2 (BC). The Permittee has developed a mine plan that will recover as much coal as is economically possible. There is no or little thickness data for the Blind Canyon and Bear Canyon Seams in or adjacent to the IBC addition to lease U-68082, and these seams will not be mined there. The nearest borehole, DH-2, is located roughly one-half mile north of the lease addition. The Division sees the small size of the area and the absence of access through adjacent workings as indicators that recovery of coal from these seams, even if thick coal were present, would probably not be economic.

Mining projections on Plate 5-2 (H) show one east-west oriented longwall panel in the Hiawatha Seam, extending into the south end of the IBC area. The Permittee states that recovery of Hiawatha coal in the IBC is speculative.

The Division is required to make a finding about maximum use and conservation of coal. On mines with federal leases, such as South Crandall Canyon Lease Extension, the BLM does this analysis through their resource recovery protection plan (R2P2) and review of the MRP. The R2P2 is included by reference in the MRP. The recommendation for approval of the R2P2 was made by the BLM on November 14, 2004.

The information in the Genwal Resources submittal for the 120-acre IBC addition to lease U-68082 is adequate to meet the minimum requirements for the coal recovery regulations. Genwal Resources added the 120 acres in order to recover a small amount of coal in the 1<sup>st</sup> Right Panel. They permitted additional areas because of the possibility of additional mining to the north.

The coal to the north is low (5 feet or less). The Permittee determined that a drilling program would be inadequate to determine if the area is mineable. They will do exploration with a continuous miner. If mining is feasible Genwal Resources will develop additional panels to the north.

The coal in the 120-acre IBC addition to lease U-68082 is bounded on the north and to the east by outcrops. The only practical access to the coal is through the Genwal Mine. The coal in the 120-acre IBC addition to lease U-68082 is marginal due to the seam thinness. The addition of the 120-acre IBC addition to lease U-68082 will allow the Permittee the ability to recover coal that would otherwise be sterilized.



## **OPERATION PLAN**

---

The BLM placed the following restrictions on the South Crandall lease area:

- Full extraction mining is not authorized in panels BC-4 and HIA-5 in areas with less than 600' of overburden until it is determined that these areas can be mined without adverse impacts to the Little Bear Canyon municipal watershed. Therefore, Condition #3 has been added to the permit.
- Mining will not be permitted until the water treatment plant is in operation for those areas identified in lease stipulation 17. At present no mining is scheduled for those areas.

### **Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan – Coal Recovery section of the regulations.

## **SUBSIDENCE CONTROL PLAN**

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

### **Analysis:**

#### **Renewable Resources Survey**

The renewable resources in the area consist of grazing, timber and water. The Permittee stated in the South Crandall amendment that some of the renewable resources in the area were surface and groundwater. The Permittee has designed the mine plan to prevent damage to those resources particularly Little Bear Spring.

#### **Subsidence Control Plan**

The updated subsidence plan includes the following information about the South Crandall lease:

- In most of the South Crandall lease, the Hiawatha and Blind Canyon seams will be extracted by longwall methods. Those areas where full extraction is not permitted by the lease agreement are: 1) Areas under Little Bear Stream with less than 600 feet of overburden, 2) areas within 1,000 feet of the southeast corner of the lease in order to protect the Mill Fork Graben and 3) areas within 1,000 feet of the southern boundary of the lease in order to protect the possible water-bearing fracture system.
- Map 5-2 BC and Map5-2H have been updated to show the area of maximum possible subsidence.

## OPERATION PLAN

February 3, 2006

- The subsidence-monitoring program for the South Crandall Lease is similar to that of the other areas. The area will have initial survey points established. The area will be aerial surveyed and surface inspections will be done.
- Effects of planned subsidence are anticipated to be a lowering of the surface and temporary tensional fractures at the margins of the subsidence areas.
- Mitigation for any disruption to the Little Bear Spring will be done through construction of a water treatment plant, which will provide replacement water for the spring.

The Permittee gave adequate information about the main power line for the site and the potential effects of subsidence because:

- The Permittee showed the location of the main power line on Plate 5-2 (BC) and Plate 5-2 (H). Those maps have a yellow line labeled as a 12.5 kV power line.
- The Permittee updated Map 5-5 to show the areas where subsidence has and is expected to occur.
- The Permittee discussed the anticipated effects that subsidence would have on the main power lines. On page 5-26b the Permittee states that they talked with Utah Power & Light officials. The officials were quoted as saying that the risks are minimal.
- The Permittee committed to notify the Forest Service in the event of any damage to the power line so that proper fire prevention measures can be implemented. The line is equipped with ground fault protection that will automatically and instantly de-energize the line in the event of any damage.

The Permittee stated that they will not do full extraction mining in areas with less than 600 feet of coal. The Permittee showed the areas with more than 600 feet of cover on Plate 5-2 (BC) and Plate 5-2 (H).

Due to lease stipulations, the Permittee made the following commitment.

“According to this plan full extraction mining (i.e. longwall mining) is not authorized in panels BC-4 and HIA-5 in areas with less than 600’ overburden unless it can be determined that these areas can be mined without adverse impacts to the Little Bear Canyon municipal watershed.

The Permittee was able to meet part of the subsidence control plan requirements in connection with the 120-acre IBC because they included the following:

- All mining in the 120-acre IBC will be done in the Hiawatha Seam. The purpose of the 120-acre addition is to allow the Permittee to mine coal that would otherwise be inaccessible.

## **OPERATION PLAN**

---

- Map 5-2 (H) shows the location of the mining that will occur in the 120-acre IBC.
- Map 5-5, Subsidence Control Point Location, shows that no new subsidence control points were added for the 120-acre IBC. The area has two existing monitoring points. Because of the small area the Division believes that additional monitoring points are not needed.

### **Performance Standards For Subsidence Control**

The Permittee is required to keep all performance standards for subsidence controls.

### **Notification**

The Permittee is required to notify the water conservancy district, and all surface owners 6 months before undermining an area. The Division will inspect the Permittee's records to determine if notification was given during quarterly complete inspections.

### **Findings:**

The information provided meets the minimum requirements of this section of the regulations.

## **SLIDES AND OTHER DAMAGE**

Regulatory Reference: 30 CFR Sec. 817.99; R645-301-515.

### **Analysis:**

The Permittee met the requirements for reporting slide and implementing emergency procedures of slides and impoundment hazards. The plans are in Section 5.15 of the MRP. [02022006]

### **Findings:**

The Permittee met the requirements for slides and other damages as stated in R645-301-515. [02022006]

## **FISH AND WILDLIFE INFORMATION**

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

**OPERATION PLAN**

February 3, 2006

**Analysis:**

**Protection and Enhancement Plan**

The only impacts to fish and wildlife would be those to habitat loss as a result of subsidence.

Crandall Creek is considered important fish habitat, and all riparian habitat is considered critical wildlife habitat. The MRP contains correspondence from the Division of Wildlife Resources discussing a wildlife protection and mitigation plan that has been developed through several months of negotiations between the permittee, Wildlife Resources, the Forest Service, Water Rights, and the Division. This plan is intended to protect the Colorado River cutthroat trout population and to mitigate for the loss of fisheries and riparian habitat.

Major points of the plan included:

1. Certain additions would be made to Crandall Creek above the mine.
2. All the fish in the area of the culvert would be captured and transplanted to a secure and suitable temporary location. Some of these fish will be put back into Crandall Creek above the mine.
3. Alterations would be made to another stream to isolate it from other fish populations. This stream would be treated to eliminate all fish, and Colorado River cutthroats would be transplanted to it.
4. In Scad Valley, a sheep corral would be eliminated and two or three new corrals constructed. Some roads would be reclaimed to try to improve the quality of spawning habitat in this area.

Unfortunately, it is possible that moving the sheep corral and reclaiming certain roads may not result in improved stream habitat in Scad Valley Creek and would not fulfill the requirements of R645-301-333 and R645-301-358. The Forest Service and Wildlife Resources intend to monitor this section of stream to see if the project is successful.

**Endangered and Threatened Species**

Of the 16 vegetative and wildlife species, one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Most threatened or endangered species that could occur in Emery

## **OPERATION PLAN**

---

County occur at lower elevations than the mine and have no habitat in the proposed permit area expansion.

There have been no confirmed sightings of Black-Footed Ferrets in Emery County in several years.

The mine has potential, through water depletions; of adversely affecting four listed threatened and endangered fish species of the upper Colorado River drainage. The Fish and Wildlife Service requires mitigation when water depletions exceed 100 acre-feet annually. Page 7-12 and appendix 3-18 of the MRP describe the use of water for mining operations. The information on page 7-12 indicates that approximately 150 gpm, (242 acre/ft/yr), are used in water consumption for mining activities. This was an estimate based on experience at other mines. The most recent submittal dated July 7, 2004 includes calculations in appendix 3-18 that define the actual amount of water used in the mining process and water that is discharged into Crandall Creek. The calculations in appendix 3-18 indicate that 79.4-acre feet per year of water are used in mining processes and approximately 800 acre feet per year of water are discharged into Crandall Creek annually. According to these calculations, the mine would provide a net gain of 729.6 acre-feet per year of water to Crandall Creek. According to the Mayo age dating studies, this mine water is old and would not be intercepting the water associated with the springs located above the mine workings.

### **Bald and Golden Eagles**

The bald eagle could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Bald eagles are common in the area during the winter and could occasionally fly through or roost in the proposed lease addition to the permit area. The raptor survey conducted in the spring of 2003 indicated that there were no golden eagle nests in the proposed lease area. The proposed mining in both the South Crandall lease and 120-acre IBC addition to lease U68082 areas would have negligible effects on these birds.

### **Wetlands and Habitats of Unusually High Value for Fish and Wildlife**

The springs and riparian areas within the proposed 120-acre IBC addition to lease U-68082 addition would be considered habitats of high value for fish and wildlife. However, since no surface disturbance is anticipated by this permitting action the only effects on habitat would possibly be from subsidence. Any impacts on fish and wildlife habitat due to subsidence would be negligible.

**OPERATION PLAN**February 3, 2006

---

**Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan – Fish and Wildlife sections of the regulations.

**TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

**Analysis:****Topsoil Removal and Storage**

A difference exists between the nutrient content of the A and C horizons of the Datino variant soil to be disturbed by expansion of the Forest Service Trailhead. However, the plan indicates in Section 2.24 that the JDE map unit will be salvaged and used for cover over the DPH2 map unit which soils were not salvaged due to slope. Consequently, the soil will be salvaged in one operation down to 24 inches and placed on stockpile #4 (at the mouth of Crandall Canyon). The trailhead parking lot expansion will generate an additional 32 yd<sup>3</sup> soil in stockpile #4 (at the mouth of Crandall Canyon, pg 2-11). The soil will be left rough and seeded (p. 5-6a). Over time, The Division expects that vegetation growing on the mixture will improve the nutrient status of the subsoil.

**Findings:**

The information provided meets the soils operation plan requirements of the Rules.

**VEGETATION**

Regulatory Reference: R645-301-330, -301-331, -301-332.

**Analysis:**

Vegetation should not be affected by the addition of the 120-acre parcel. Genwal Resources Inc. is committed to taking aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation.

**Findings:**

The information provided adequately addresses the minimum requirements of the Operation Plan - Vegetation section of the regulations.

**ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES**

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

**Analysis:**

**Road Classification System**

The Permittee met the requirements by classifying each road. The Permittee listed the road classifications are listed in Section 5.27 of the MRP. [02022006]

**Plans and Drawings**

The Permittee met the requirements for providing plans and drawings for each road. Section 527, 534 and 732 contain detailed information about the road designs. [02022006]

**Performance Standards**

The Permittee must meet the performance standard for each road. The Division inspects the site on a monthly basis to ensure that all performance standards are met. [02022006]

**Primary Road Certification**

The Permittee had all primary road designs certified as required. [02022006]

**Other Transportation Facilities**

The Permittee met the requirements for descriptions and designs for other transportation facilities such as conveyors. The Permittee described those facilities in Section 527 and 534 of the MRP. [02022006]

**Findings:**

The Permittee met the requirements for the road systems and other transportation facilities as outlined for the operation phase of mining in the R645-Rules. [02022006]

**OPERATION PLAN**

February 3, 2006

---

**SPOIL AND WASTE MATERIALS**

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

**Analysis:**

**Disposal Of Noncoal Mine Wastes**

The Permittee met the requirements for disposal of noncoal waste. In Section 5.28.30 of the MRP, the Permittee describes how noncoal mine waste will be disposed of in a state approved landfill. [02022006]

**Coal Mine Waste**

The Permittee met the requirements for disposal of coal mine waste as outlined in Section 5.28.30 of the MRP. The Permittee encounters limited amounts of coal mine waste which is transported to approved sister facilities. [02022006]

**Refuse Piles**

There are not refuse piles within the permit area. [02022006]

**Impounding Structures**

There are no impounding structures constructed from coal mine waste. [02022006]

**Burning And Burned Waste Utilization**

The Permittee must handle all burning waste in accordance with MSHA regulations.

**Return of Coal Processing Waste to Abandoned Underground Workings**

The Permittee does not propose to return coal processing waste to abandoned underground workings. [02022006]

**Excess Spoil**

The Permittee does not propose to produce any excess spoil at the site. [02022006]



**Findings:**

The Permittee met the requirements for spoil and waste materials. [02022006]

**HYDROLOGIC INFORMATION**

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

**Analysis:**

**General**

**Groundwater Monitoring**

The groundwater monitoring plan has been updated to include the monitoring of eight springs and seeps located within and adjacent to the South Crandall lease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; springs LB-7, LB-7A, and LB-7B, that discharges from the base of the Castlegate Sandstone north slope of Little Bear Canyon; springs LB-7c, LB-5A, and LB-12 that discharges from a sandstone channels in the Blackhawk Formation in Little Bear Canyon; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

In order to conduct multiple seam mining beyond spring site LB-7, a monitoring plan must be submitted and approved by the Division in concurrence with the Forest Service at least two years prior to mining in that area. Multiple seam mining will therefore be contingent upon meeting this requirement.

Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, additional surveys are to be conducted in 2005 that include: a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and a detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

As a stipulation of the South Crandall lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Lessee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to

## OPERATION PLAN

February 3, 2006

assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, PacifiCorp, and the Castle Valley Special Service District. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51.

The groundwater monitoring plan has been updated to include the monitoring of two springs and seeps (SP-18 and SP-22) located within the U-68082 Lease Mod Area as shown on Plate 7-18. According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the U-68082 Lease Mod Area, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the groundwater discharge at the springs would be diverted to the mine workings through mine-induced fractures, the Division did not recommend additional groundwater monitoring. However, the USFS owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water-monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water-monitoring plan that includes quarterly monitoring for flow and field parameters of spring sites SP-18 and SP-22. Spring SP-22 issues from the Blackhawk Formation within the potential subsidence area of the 120-acre addition. Spring SP-18 issues from the Star Point Formation beneath the coal seam and outside of the potential subsidence boundary. The spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

### Surface Water Monitoring

The surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the perennial Little Bear Canyon Creek (intermittent upstream of Little Bear Spring), the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek; the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be

## **OPERATION PLAN**

---

monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

The surface water-monitoring plan has been updated to include the monitoring of Shingle Creek within the 120-acre IBC addition to lease U-68082 as shown on Plate 7-18. Shingle Creek is an intermittent creek that branches into a right and left fork at the east boundary of the lease mod area. Because Shingle Creek is intermittent, and only a portion of the upper reaches of the right and left forks flows within the potential subsidence area, no additional surface water monitoring was recommended by the Division. However, the Forest Service owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water-monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water monitoring plan that includes quarterly monitoring for flow and field parameters of a stream site for Shingle Creek located just downstream of spring site SP-18 and the confluence of the left and right forks of Shingle Creek. The creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

### **Acid- and Toxic-Forming Materials and Underground Development Waste**

#### **Transfer of Wells**

Transfer of wells is not currently considered. Any future transfers will be in accordance with DOGM approval.

#### **Discharges Into An Underground Mine**

#### **Gravity Discharges From Underground Mines**

#### **Water-Quality Standards And Effluent Limitations**

#### **Diversions: General**

#### **Diversions: Perennial and Intermittent Streams**

## OPERATION PLAN

February 3, 2006

### **Diversions: Miscellaneous Flows**

### **Stream Buffer Zones**

### **Sediment Control Measures**

The MRP meets the Operation Plan Information for Sediment Control Measures as provided in **R645-301-732**. As stated in Section 7.42, Sediment Control Measures, methods used for sediment control include:

- 1) Retaining sediment within the disturbed area;
- 2) Diverting runoff away from the disturbed area;
- 3) Diverting runoff using protected channels or pipes;
- 4) Using structures to reduce overland flow velocities, reduce runoff volumes, or trap sediment;
- 5) Treating with chemicals and paving; and
- 6) Treating mine drainage in underground sumps.

These methods are generally implemented by the use of structures such as diversion channels, a sedimentation pond, containment berms, silt fences, and road diversion culverts. As stated in Section 7.42, and the calculations and design of sediment control structures presented in Appendices 7-4 through 7-10, these sediment control measures are designed using industry standards and what is generally considered the Best Technology Currently Available (BTCA). The MRP meets the Design Criteria Plans for Sediment Control Measures as provided in **R645-301-742** because the sediment control measures are designed to prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area; meet the more stringent of applicable State or Federal effluent limitations; and, minimize erosion to the extent possible. The Division's findings on how the various sediment control structures for the Crandall Canyon Mine meet the requirements of the State regulations are presented below. [01202006]

### **Siltation Structures: General**

The MRP meets the Operation Plan Information for Siltation Structures as provided in **R645-301-732.100**. Siltation structures within the permit area include a sedimentation pond that controls sediment for the disturbed area and designated drainages above, and alternative sediment control areas (ASCAs) that control sediment in disturbed areas that do not report to the sedimentation pond. The Division's findings on how these siltation structures for the Crandall Canyon Mine meet the requirements of the State regulations are presented below. [01202006]

### **Siltation Structures: Alternative Sediment Control Areas (ASCAs)**

The MRP meets the Operation Plan Information for Alternative Sediment Control Areas (ASCAs) as provided in **R645-301-732.100**. ASCAs are used to control sediment in disturbed areas within the permit area that do not report to the sedimentation pond. There are eight ASCAs listed in Section 7.42.21 of the MRP (ASCAs-2, -5, -6, -7, -8, -9, -10, and -11). The ASCAs described in the MRP have been implemented in the field, and represent the Best Technology Currently Available (BTCA). The ASCAs utilize a combination of silt-fencing, straw bale dikes, berms, and/or vegetative cover to control sedimentation. Typical straw bale dike and silt fence installation is presented in Figures 7-11 and 7-12, respectively, of Chapter 7 of the MRP. The ASCAs are briefly described below.

ASCA-2 – Located at the northwest portion of the disturbed area at a partially reclaimed proposed substation pad within watershed boundary WSUD-2. Consists of a silt fence and straw bale dike placed to trap sediment and prevent erosion from drainage UD-2 prior to discharge to a culvert (C-6) which discharges into culvert UD-1.

ASCAs-5, -6, -7, and -11 – Topsoil stockpiles located east of the facility's disturbed area along the north and south sides of the access road (see Plate 2-3 of the MRP). Consists of a combination of dikes, silt fencing, berms, and vegetative cover to protect the stockpiles from erosion and treat run-off.

ASCA-8 – Forest Service parking area within the disturbed area. Consists of silt fencing installed between the parking area and Crandall Canyon Creek.

ASCAs-9 and -10 – Pad slope areas at both ends of the culvert expansion project (main culvert for Crandall Creek). Consists of a combination of straw bale dikes, silt-fencing, and vegetative cover to control sediment to Crandall Creek. Once vegetation has been established, Genwal intends to apply for a Small Area Exemption (SAE) for these two ASCAs.

One ASCA (ASCA-4) and two SAEs (SAE-1 and -2) were eliminated from the MRP following completion of the culvert expansion project. [01202006]

### **Siltation Structures: Sedimentation Ponds**

The MRP meets the Operation Plan Information for Sedimentation Ponds as provided in **R645-301-732.200**. Sediment control for the mine facility disturbed area consists of one sedimentation pond. The original sedimentation pond for the Genwal Mine was redesigned and replaced in 1997 to accommodate expansion of the surface facilities and disturbed areas. The sedimentation pond is described in Section 7.42.22 and results of the analysis to determine the

---

**OPERATION PLAN**

---

February 3, 2006

required size and hydraulics of the sedimentation pond are presented in Appendix 7-4 (Sections 3.1 through 3.3) of the MRP. The redesigned sedimentation pond calculations were updated and stamped by a professional engineer (Mr. Dan Guy) for Appendix 7-4 in 2001. The as-built drawing and cross sections of the revised Genwal sedimentation pond is presented as Plate 7-3. The plate was amended to reflect surveys conducted following pond cleaning in November 2003.

The MRP meets the Design Criteria Plans for Sedimentation Ponds as provided in **R645-301-742.220**. The sedimentation pond is designed to fully contain the runoff from the 10-year/24-hour precipitation event along with 3 years of sediment storage. The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from all drainage areas contributing to the pond. The required volume for the sedimentation pond is calculated at 2.488 acre-feet (ac-ft) that include a runoff volume of 2.060 ac-ft, direct precipitation into the pond of 0.092 ac-ft, and 3 years of sediment storage of 0.336 ac-ft. The existing sedimentation pond is over-designed to hold a volume of 3.572 ac-ft at its principle spillway. The pond is equipped with a culvert principle spillway and a cement-lined open channel emergency spillway. The principle spillway is designed to adequately pass the 25-year/6-hour precipitation event. Because the storage capacity of the pond is less than 20 ac-ft, it is not required to comply with requirements of the MSHA, 30 CFR 77.216(a). Discharge from the pond (principle and emergency spillways) is to Crandall Creek. [01202006]

**Siltation Structures: Other Treatment Facilities**

There are no other treatment facilities for the Crandall Canyon Mine. [01202006]

**Siltation Structures: Exemptions**

No Small Area Exemptions (SAE) are identified in the MRP. Genwal intends to apply for a SAE once vegetation has been established at ASCAs-9 and -10 located at the pad slope areas at both ends of the culvert expansion project. Two SAEs (SAE-1 and -2) have been eliminated from the MRP following completion of the culvert expansion project. [01202006]

**Discharge Structures****Impoundments**

The sedimentation pond is the only impoundment within the permit area. [01202006]

## **OPERATION PLAN**

---

### **Ponds, Impoundments, Banks, Dams, and Embankments**

#### **Findings:**

The Operation Plan for Hydrologic Information meets the requirements of the State regulations. [01202006]

### **SUPPORT FACILITIES AND UTILITY INSTALLATIONS**

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

#### **Analysis:**

The Permittee met the requirements for describing the support facilities and utility installations as outline in R645-301-526. . [02022006]

#### **Findings:**

The Permittee met the requirements of the support facilities and utility installation section of the R645-Rules. [02022006]

### **SIGNS AND MARKERS**

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

#### **Analysis:**

The Permittee met the requirements for placing signs and markers as outlined in the R645-Rules. The Permittee states in Section 521 of the MRP how the signs will be placed. [02022006]

#### **Findings:**

The Permittee met the requirements for signs and markers. [02022006]

### **USE OF EXPLOSIVES**

Regulatory Reference: 30 CFR Sec. 817.61, 817.62, 817.64, 817.66, 817.67, 817.68; R645-301-524.

---

**OPERATION PLAN**

---

February 3, 2006

**Analysis:**

**General Requirements**

The Permittee will provide the Division with blasting plans as needed. [02022006]

**Preblasting Survey**

NA

**General Performance Standards**

NA

**Blasting Signs, Warnings, And Access Control**

NA

**Control of Adverse Effects**

NA

**Records of Blasting Operations**

**Findings:**

The Permittee met the explosive requirements of the R534-Rules. [02022006]

**MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS**

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

**Analysis:**

**Affected Area Maps**

The Permittee met the requirements for showing the affected area boundaries. The Division considers that the affected area is the same as the permit area for the Genwal Mine. Several maps show the affected area boundary including Map 1-1, Lease Map. [02032006]

**Mining Facilities Maps**



## **OPERATION PLAN**

---

The Permittee met the requirements for showing the mine facilities. Plate 5-3, Surface Facilities Map, show the location of the mine facilities in the disturbed area. [02032006]

### **Mine Workings Maps**

The Permittee met the requirements for showing the mine workings on Plate 5-2 (BC) and Plate 5-2 (H.) [02032006]

### **Monitoring and Sampling Location Maps**

The Permittee met the requirement to show monitoring locations by providing Plate 7-16, Stream Monitoring Stations, Crandall Canyon Mine Area. [02032006]

### **Certification Requirements**

The Permittee met the certification requirement by all maps and plans listed under R645-301-512. [02032006]

### **Findings:**

The Permittee met the requirements for maps, plans and cross sections for the mining operations. [02032006]

## RECLAMATION PLAN

February 3, 2006

# RECLAMATION PLAN

## GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

### Analysis:

### Findings:

## POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

### Analysis:

### Findings:

## PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

### Analysis:

For those areas disturbed by mining activities, high value habitats (pinyon-juniper, agricultural and riparian areas) will be restored; in many cases, they will be enhanced beyond their premining condition. The goals are to create a diversified cover and/or habitat that will support a wide range of species while restoring to a premining condition and, where feasible, enhancing habitat. On September 21, 1993, representatives from Genwal, the Division, and Wildlife Resources met on-site to discuss wildlife habitat enhancement for reclamation. Subsequently, Wildlife Resources wrote Genwal a letter with enhancement suggestions. This

## **RECLAMATION PLAN**

---

letter has been incorporated in the plan, and Genwal commits to use the recommendations. They include making several rock piles and placing modified utility poles with attached nesting boxes near the perimeter of the disturbed area. These measures were felt by Wildlife Resources to be the most practical means of enhancing wildlife habitat in this area. Combined with the revegetation plan, these methods can be considered the best technology currently available.

### **Findings:**

The information provided adequately addresses the minimum requirements of the Reclamation Plan – Protection of Fish, Wildlife, and Related Environmental Values sections of the regulations.

## **APPROXIMATE ORIGINAL CONTOUR RESTORATION**

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

### **Analysis:**

### **Findings:**

## **BACKFILLING AND GRADING**

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

### **Analysis:**

#### **General**

#### **Previously Mined Areas**

#### **Backfilling and Grading On Steep Slopes**

#### **Special Provisions for Steep Slope Mining**

### **Findings:**

## RECLAMATION PLAN

February 3, 2006

### MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

#### Analysis:

The Permittee met the requirements for closing mine openings. See Section 5.29 of the MRP for details. [02032006]

#### Findings:

The Permittee met the requirements for managing mine opens. [02032006]

### TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

#### Analysis:

##### Redistribution

Currently there are 12,912 yd<sup>3</sup> stored in four stockpiles (p. 2-11) that will be used over 6.41 acres (p. 2-10, Fig 8C), including the recent expansion of the U.S. F. S. trailhead/parking lot. These figures indicate that there is enough stockpiles topsoil to cover the 6.41 acres with an average of 15 inches of topsoil.

#### Findings:

Information provided meets the requirements of the Rules.

### ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

#### Analysis:

##### Reclamation

## **RECLAMATION PLAN**

---

The Permittee will met the requirements for road reclamation by reclaiming all roads within the permit area with the exception of the USFS development road. See Section 5.42.600 of the MRP for details. [02032006]

### **Retention**

The Permittee will met the requirements of this section by retaining and modifying the USFS development road that is within the disturbed area. See Section 5.42.600 of the MRP for details. [02032006]

### **Findings:**

The Permittee met the requirements for reclamation and retention of roads at time of reclamation. [02032006]

## **HYDROLOGIC INFORMATION**

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

### **Analysis:**

#### **Hydrologic Reclamation Plan**

### **Findings:**

## **CONTEMPORANEOUS RECLAMATION**

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

### **Analysis:**

#### **General**

### **Findings:**

## **REVEGETATION**

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

## RECLAMATION PLAN

February 3, 2006

### Analysis:

#### Revegetation: General Requirements

It should be noted that there is no surface disturbance associated with the South Crandall lease area, the additional 40-acre sublease area, or the 120-acre IBC addition to lease U-86082. However, for those areas disturbed by mining activities topsoil will be redistributed within 30 days of completion of grading in late September or early October. Soil amendments will be applied if necessary before the end of October. Seeding will commence as soon as the seedbed is finished in the late fall. Tree planting will be done in conjunction with seeding or in the following spring as soon as the soil is workable.

The Permittee commits to inoculating the soil with microorganisms prior to seeding. Some research indicates this is a necessary step for establishing certain species although there has been successful revegetation in some areas with essentially sterile soil and no attempt to inoculate. The Permittee and the Division should look at current findings at the time of reclamation to determine the best methods.

The MRP contains a seed/planting mix for riparian and one for non-riparian areas. The seed mix for non-riparian areas was developed primarily for the south-facing slope where existing disturbances are located. The north-facing slope has a very different vegetation community, but many of the species in the existing seed/planting mixture are appropriate for the north-facing slopes. Also, the MRP contains a plan to transplant woody plants of species more suited to the north-facing slopes.

The seed/planting mix for riparian areas includes a mixture of species suitable for both upland and riparian areas. Willows, dogwoods or roses would be planted at one-foot intervals along the stream. In response to comments from the Forest Service, the Permittee has committed to plant horsetail plugs about every two feet. Additional trees and shrubs would be planted farther away from the creek.

The seeding and planting mixes in the plan fulfill regulatory requirements for introduced species, diversity, seasonality, and the postmining land use. Three introduced species are included, and they are all highly desirable. They should not be overly competitive or displace native species in the area. Small burnet and yellow sweet clover are fairly short-lived species that will probably not be present after the ten-year extended responsibility period. The seed and planting mixes are expected to provide successful revegetation if proper reclamation methods are used.

## RECLAMATION PLAN

---

The entire area of disturbance will be hydromulched with long fiber wood mulch. Tackifying agents will be added to the hydromulch, and the MRP shows tackifier MRP rates for varying slopes.

The Permittee and the Division investigated the use of various mulches, particularly for the steep north-facing hillside. There are many types of hydromulch available, and the Permittee intends to use one with coarse, long fibers. This type of mulch is preferred over a mat because mats often have erosion under them.

It is anticipated that mulch technology will change over the next several years until the site is reclaimed. The Permittee will need to use the best technology currently available to control erosion and sedimentation, particularly in the area near the stream.

No irrigation is anticipated. The Permittee commits to avoid using persistent pesticides and to prevent personnel-caused fires. However, a contingency irrigation plan is recommended for transplants. Dry conditions could necessitate watering transplants for the first one or two summers.

Musk thistle is a very serious problem at mid- to high elevations in Utah. Although this noxious weed is not widespread in Huntington Canyon, it has been found at the Crandall Canyon Mine. Disturbed and newly seeded areas are very prone to noxious weed invasion. The Permittee should plan now for noxious weed control during reclamation, as it will almost certainly be necessary.

On January 1, 1994, the Forest Service issued a closure order for any straw or hay that is not certified to be free of noxious weeds. This includes transportation across Forest Service lands. The applicant is not planning to use straw or hay mulch in reclamation, but any straw or hay bales that are used for sediment control will need to be certified.

### **Revegetation: Timing**

### **Revegetation: Mulching and Other Soil Stabilizing Practices**

### **Revegetation: Standards For Success**

A vegetation reference area has been established in the mountain shrub/grassland community above the mine portals for comparison with vegetation on reclaimed areas that had this community before mining. Another reference area has been established to compare to areas with spruce/fir/aspen communities. This reference area is south of the portal development area.

**RECLAMATION PLAN**

February 3, 2006

---

Woody plant density standards have been established for three areas of the mine. For areas to be compared with the mountain shrub/grassland reference area, the standard for woody species density has been set at 1336 shrubs per acre. This is based on reference area data. The standard for north-facing slopes has been set at 4000 per acre based on baseline information in the plan and consultation with Wildlife Resources. The riparian area has about 11,224 shrubs and trees per acre, and shrubs and trees will be planted in this area at the rate of about 3000 per acre. It is expected that these will multiply through the extended responsibility period, and the success standard has been set at 6000 per acre.

There are some differences between the disturbed and reference area spruce/fir/aspen communities, but they are primarily in species composition rather than the total amount of cover. The current reference area has 75.25% total living cover, and the disturbed area has 78.75%.

These values are not statistically different at the 90% confidence level. The proposed disturbed area has statistically more overstory than the reference area, but understory cover values are statistically the same for both areas. Also, the woody species density is higher in the reference area.

Despite the differences between the proposed disturbed and reference areas, there are several similarities, including location, community type, soils, aspect, and total cover. The actual species present and the amount of cover from overstory vary, but these will vary even more significantly when comparing reclaimed and reference areas. Additionally, the woody plant density success standards are established in consultation with Wildlife Resources rather than being based strictly on baseline information in the plan. For these reasons, the reference area is considered an acceptable revegetation success standard for spruce/fir/aspen areas.

Portions of the north-facing slope have been affected by natural soil movement and have less vegetation than adjacent areas. The Division could accept a different revegetation success standard for these areas rather than comparing them to the spruce/fir/aspen reference area. However, the permittee has not included a separate standard in the MRP even though the report from the permittee's consultant discusses using another standard. A revegetation reference area was not proposed, and the number of samples taken in these areas is not sufficient to allow the baseline method to be used.

In order to meet the erosion control performance standards in the areas that have had soil movement, it will probably be necessary to establish nearly as much vegetation as in spruce/fir/aspen areas. The main question is whether establishing this much vegetation is feasible. The various revegetation and stabilization techniques that are planned should allow more vegetation to become established than currently exists. If, in the future, the permittee desires to propose a reference area revegetation success standard in a similar area, the Division could compare it to the area now proposed to be disturbed. If there is some possibility a different



## RECLAMATION PLAN

---

success standard may be proposed in the future, the areas with soil movement should be mapped now.

The approved MRP includes diversity standards for all disturbed areas. The standards currently in the plan are minimum and maximum relative cover values for grasses, shrubs, and broadleaf forbs in the three major disturbed vegetation types. In addition, the MRP states that no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of shrubs and trees will make up no more than 80% of the density for this class. The approved MRP gives a monitoring schedule and methodologies for checking success of revegetation. In the disturbed spruce/fir/aspen areas, the standard will be 3-15% relative cover from broadleaf forbs, at least 15% cover from trees and shrubs, and the balance from grasses. This leaves a lot of latitude between grasses and woody plants since woody plants are expected to eventually dominate the area. Until then, grasses are expected to dominate the cover.

The riparian area should be dominated by woody species. The standard is 5-10% relative cover from broadleaf forbs, 40-85% relative cover from trees and shrubs, and 10-50% relative cover from grasses and grass-like plants.

For both riparian and spruce/fir/aspen areas, as in the other areas, no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of trees and shrubs will make up no more than 80% of the density for this class.

The diversity standards for south-facing slopes are based on Natural Resource Conservation Service range site potential plant community data. For riparian areas and north-facing slopes, the standards are based on professional judgment by a soil scientist and botanist with the Forest Service and a Division biologist. The standards allow some flexibility but ensure a reasonably diverse plant community.

R645-301-353.140 requires that the vegetative cover be capable of stabilizing the soil surface from erosion. The permittee intends to use the Erosion Condition Classification System to compare reclaimed areas with adjacent undisturbed areas. This method was developed by the Office of Surface Mining, and while it is a qualitative judgment, it provides a reasonably good estimate of how stable a site is. Even if vegetative cover is equal to that of the reference area, the reclaimed area may not be stable. R645-301-356.250 says that for areas previously disturbed by mining that were not reclaimed and that are remined or redisturbed, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and will be adequate to control erosion. The vegetative ground cover existing before redisturbance was 50.3%. Relatively little of this cover was from plants that would be considered weeds. This figure has been established as the vegetative cover standard for success for the areas previously disturbed by mining.

## **RECLAMATION PLAN**

February 3, 2006

### **Findings:**

The information provided adequately addresses the minimum requirements of the Reclamation Plan - Revegetation section of the regulations.

## **STABILIZATION OF SURFACE AREAS**

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

### **Analysis:**

The 20 ft cut in the slope will remain after final reclamation and will be contemporaneously reclaimed with the final seed mix, less alfalfa and yellow sweetclover (p. 5-6b).

### **Findings:**

The information provided meets the requirements of the Rules.

## **CESSATION OF OPERATIONS**

Regulatory Reference: 30 CFR Sec. 817.131, 817.132; R645-301-515, -301-541.

### **Analysis:**

### **Findings:**

## **MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS**

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

### **Analysis:**

#### **Affected Area Boundary Maps**

The Permittee met the requirements for showing the affected area boundaries. The Division considers that the affected area is the same as the permit area for the Genwal Mine. Several maps show the affected area boundary including Map 1-1, Lease Map. [01302006]

## **RECLAMATION PLAN**

---

### **Bonded Area Map**

The Permittee met the requirements for showing the bonded area map. The Division considers the bonded area is the same as the disturbed area for the Genwal Mine. Several maps show the bonded (disturbed) area including Map 5-3, Surface Facility Map. [01302006]

### **Reclamation Backfilling And Grading Maps**

The Permittee met the requirements for showing the reclamation backfilling and grading maps. Those maps are 5-16, Reclamation Phase I and maps 5-17, 5-17A and 5-71B, Reclamation Phase 2 including cross sections. [01302006]

### **Reclamation Facilities Maps**

The Permittee met the requirements for showing the reclamation facilities on a map. Map 5-17 shows the road that will be left open to access USFS lands. [01302006]

### **Final Surface Configuration Maps**

The Permittee met the requirements for showing the final surface configuration maps. Those maps are 5-16, Reclamation Phase I and maps 5-17, 5-17A and 5-71B, Reclamation Phase 2 including cross sections. [01302006]

### **Reclamation Monitoring And Sampling Location Maps**

The Permittee met the requirements for showing the monitoring and sampling locations. The water monitoring locations are shown on Map 7-16, Stream Monitoring Stations. [01302006]

### **Reclamation Surface And Subsurface Manmade Features Maps**

The Permittee met the requirements for showing the reclamation facilities on a map. Map 5-17 shows the road that will be left open to access USFS lands. [01302006]

## **RECLAMATION PLAN**

---

### **Reclamation Treatments Maps**

The Permittee met the requirements for showing the reclamation treatments that will be used during reclamation. Those facilities are shown on the various hydrology maps. [01302006]

### **Certification Requirements.**

The Permittee met the requirements for having all required maps certified. [01302006]

### **Findings:**

Information provided in the proposed amendment is considered adequate to meet the requirements of this section. [01302006]

## **BONDING AND INSURANCE REQUIREMENTS**

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

### **Analysis:**

#### **General**

The Permittee met the minimum requirements by providing the Division with information about the reclamation cost estimates and proper bond and insurance. [01202006]

#### **Form of Bond**

The Permittee met the minimum requirements by providing the Division with a bond in the proper form. [01202006]

#### **Determination of Bond Amount**

The Division determines the amount of bond needed to insure that reclamation will be completed in the event of bond forfeiture. [01202006]

#### **Terms and Conditions for Liability Insurance**

The Permittee met the minimum requirements for insurance and the Division checks the insurance certificate during each complete inspection. [01202006]

**Findings:**

Information provided in the proposed amendment is considered adequate to meet the requirements of this section. [01202006]

---

**SPECIAL CATEGORIES**

---

## **REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING**

### **INTRODUCTION**

Regulatory Reference: 30 CFR Sec. 785; R645-302, et seq.

**Analysis:**

NA [01202006]

**Findings:**

### **EXPERIMENTAL PRACTICES MINING**

Regulatory Reference: 30 CFR Sec. 785.13; R645-302-210, -302-211, -302-212, -302-213, -302-214, -302-215, -302-216, -302-217, -302-218.

**Analysis:**

NA [01202006]

**Findings:**

### **MOUNTAINTOP REMOVAL MINING**

Regulatory Reference: 30 CFR Sec. 785.14, 824; R645-302-220, et. seq.

**Analysis:**

NA [01202006]

**Special Permanent Program Performance Standards--Mountaintop Removal**  
NA [01202006]

**Findings:**

## **STEEP SLOPE MINING**

Regulatory Reference: 30 CFR Sec. 785.15; R645-302-230 et. seq.

### **Analysis:**

NA [01202006]

### **Findings:**

## **PRIME FARMLAND**

Regulatory Reference: 30 CFR Sec. 785.16, 823; R645-301-221, -302-300 et seq.

### **Analysis:**

#### **Prime Farmland Application Contents**

NA [01202006]

#### **Consultation with Secretary of Agriculture**

NA [01202006]

#### **Issuance of Permit**

NA [01202006]

#### **Soil Removal and Stockpiling**

NA [01202006]

#### **Soil Replacement**

NA [01202006]

---

**SPECIAL CATEGORIES**

---

**Revegetation and Restoration of Soil Productivity**

NA [01202006]

**Findings:**

**COAL PREPARATION PLANTS NOT LOCATED WITHIN THE PERMIT  
AREA OF A MINE**

Regulatory Reference: 30 CFR Sec. 785.21, 827; R645-302-260, et seq.

**Analysis:**

NA [01202006]

**Findings:**

**OPERATIONS IN ALLUVIAL VALLEY FLOORS**

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

**Analysis:**

**Essential Hydrologic Functions**

NA [01202006]

**Protection of Agricultural Activities**

NA [01202006]

**Monitoring**

NA [01202006]

**Findings:**



## **IN SITU PROCESSING**

Regulatory Reference: 30 CFR Sec. 828; R645-302-254.

### **Analysis:**

NA [01202006]

### **Findings:**

## **AUGER MINING**

Regulatory Reference: 30 CFR Sec. 785.20, 819; R645-302-240 et. seq.

### **Analysis:**

NA [01202006]

### **Findings:**

## **CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)**

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

### **Analysis:**

The Division has updated the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Addition area (March 28, 2005).

### **Findings:**

The MRP contains sufficient hydrogeologic information for the Division to update the East Mountain CHIA. [01202006]

Page 68  
C/015/0032  
February 3, 2006

CHIA

---

**APPENDICES**

---

**APPENDICES**

Page 70  
C/015/0032  
February 3, 2006

## APPENDICES

---

## **SUMMARY OF COMMITMENTS**

---

February 3, 2006

### **SUMMARY OF COMMITMENTS**

The summary below presents a list of commitments stated within the mining and reclamation plan (MRP). This list provides the following information for each commitment, when applicable:

- Title.
- Objective.
- Frequency.
- Status.
- Reports.
- Citation.

BEGIN COMMITMENT LIST BELOW

Page 72  
C/015/0032  
February 3, 2006

## **SUMMARY OF COMMITMENTS**

---

**PERMIT INFORMATION TABLE**

---

February 3, 2006

**PERMIT INFORMATION TABLE**

O:\015032.CRA\FINAL\WG2350\WG2350fin.doc